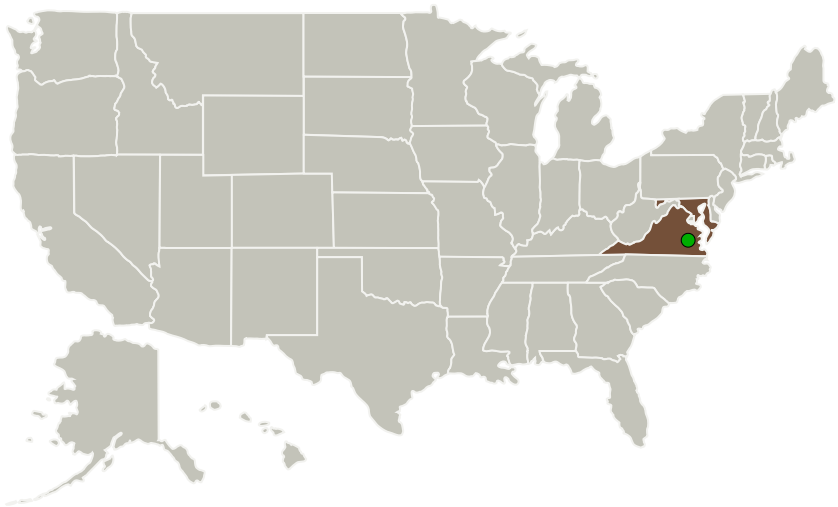
Acousto-Optic Tunable Filter-Based Polarimetric Spectral Sensor With Progressive Algorithm For Material Analysis and Mapping, Phase I

Completed Technology Project (2014 - 2014)

Project Introduction

The prevalence of off earth landing missions both proposed and undertaken has been steadily increasing. With the proposal of missions, not only to Mars, but also to comets, asteroids and outer planet moons, the ruggedness and robustness of equipment must meet the challenges of ever harsher environments. As a part of these missions, researchers wish to analyze the materials which make up the surface of these bodies and search for organic material. Brimrose proposes to develop a novel, compact, fast spectropolarimeter that will be capable of operating in the short wave infrared. The analysis of polarized light can help discriminate and classify materials and identify objects of. Measurement of polarization state can also provide various characteristics such as surface properties, shape, shading, and roughness, and can be used to identify unique features that will allow more accurate discrimination between various materials than spectral data alone. Development of space-ready hardware and algorithms for the detection and analysis of polarized light in space based analysis applications is needed to enable high confidence material discrimination. The development of proposed full-scope spectropolarimeter will offer a dramatically improved optical solution for material analysis by performing fast spectral profile acquisition with an additional feature of complete polarization information.

Primary U.S. Work Locations and Key Partners



Acousto-Optic Tunable Filter-Based Polarimetric Spectral Sensor With Progressive Algorithm For Material Analysis and Mapping, Phase I

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Completed Technology Project (2014 - 2014)

Organizations Performing Work	Role	Type	Location
Brimrose Technology Corporation(BTC)	Lead Organization	Industry	Sparks, Maryland
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia
University of Maryland-Baltimore County(UMBC)	Supporting Organization	Academia	Baltimore, Maryland

Primary U.S. Work Locations	
Maryland	Virginia

Project Transitions

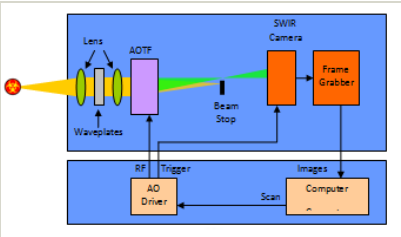
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140637)*

Images



Briefing Chart
Acousto-Optic Tunable Filter-Based Polarimetric Spectral Sensor With Progressive Algorithm For Material Analysis and Mapping, Phase I *(https://techport.nasa.gov/image/130433)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Brimrose Technology Corporation (BTC)

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Sudhir B Trivedi

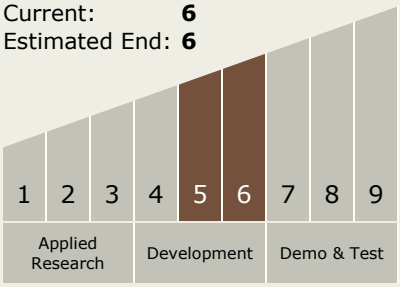
Co-Investigator:
Sudhir Trivedi

Acousto-Optic Tunable Filter-Based Polarimetric Spectral Sensor With Progressive Algorithm For Material Analysis and Mapping, Phase I

Completed Technology Project (2014 - 2014)

Technology Maturity (TRL)

Start: **5**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.4 Environment Sensors

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System